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A Benefits/Challenges Framework for Outsourcing Software Development

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Abstract

As the information technology industry grows, many companies are rethinking their approach to outsourced software development (OSD). This research uniquely explores the premise that many of the benefits of outsourcing software development are also challenging and many of the traditional challenges have beneficial aspects, as set out in a benefits/challenges framework. Additionally, the differences between anticipated/realised benefits and anticipated/occurred challenges are investigated. Ten companies who engage in OSD confirm the benefits / challenges framework in skills, cost, culture, development speed, quality, market proximity, employees and legal aspects of OSD. An unexpected OSD benefit was scalability, outsourcing that enables a company to rapidly scale up production; this is a novel contribution to the literature from this research. Cost reductions from OSD were seen as a significant benefit, but controlling unanticipated costs was also a major challenge, reflecting the paradoxical nature of OSD benefits and challenges fully explored in this research.

Keywords

Outsourcing, software development, benefits, challenges

INTRODUCTION

Most technology has some form of software associated with it, from embedded software in microcontrollers to Web-based software hosted in the cloud. Some software is purchased off the shelf (e.g. Microsoft Office). Other software is built "in-house" by the company that then owns the software. The third option for software development is outsourcing. Many similar terms subtly different in definition – offshoring, bestshoring, nearshoring and onshoring – describe outsourcing.

In this study, outsourcing is defined as "contracting with a third-party provider for management and completion of a certain amount of work, for a specified length of time, cost, and level of service" (Oshri et al. 2011, p. 7). This research focuses on outsourcing software development (OSD), contracting a third party to perform a software development function such as development of a complete software product, maintenance of an existing product, or testing a software product developed in-house.

The purpose of this study is to identify the interacting benefits and challenges that are associated with outsourced software development in a benefits/challenges framework developed from the literature. Secondarily, the research identifies anticipated, realised and unexpected benefits and challenges from the outsourcing experience.

BACKGROUND

A number of different facets of IT services can be outsourced such as infrastructure and data management, enterprise resource planning system support, IT helpdesk support and software development and testing. A study of trends in large European companies between 2009 and 2010 indicates increased outsourcing activity across all of these facets apart from infrastructure and data warehousing (Oshri et al. 2011). Companies within the United States (US) were early adopters of outsourcing and are still the major source of outsourcing work. Now companies in regions such as Europe, Asia and the Pacific are joining in the outsourcing approach (Oshri et al. 2011). India is the most popular destination for outsourcing of IT services, especially in software development, with China having a quarter of software exports compared to India (Carmel et al. 2008).

Increases in outsourced software development will most likely impact on which future skill sets will be most desirable in countries that are very active in outsourcing, such as the US. As software development is moved

offshore, skills that will be in demand will be associated with the management of the development. This includes project and program management instead of skills such as programming (McLaughlin and Deuel 2003).

LITERATURE REVIEW: OUTSOURCING DECISION THEORIES

The decision to outsource is usually a complex one. A number of studies have examined the theoretical frameworks that explore the decision to outsource. The theories of transaction cost economics, agency theory and knowledge-based theory are the most commonly cited (e.g., Aubert et al. 2004; Lee et al. 2003; Lichtenstein 2004; Mukherji and Ramachandran 2007; Tiwana and Bush 2007). This section briefly explores the transaction cost and agency theories in regards to the decision to engage in OSD.

Transaction cost economics theory focuses on the decision to outsource at a high-level by highlighting there is a choice between whether to "buy" (from the market – outsource) or "make" (within the organisation). According to transaction cost theory, the decision is made by assessing the benefits and costs of both options and selecting the option with the highest net benefit for the organisation (Mukherji and Ramachandran 2007). This theory also examines the balance of the production and transaction costs associated with outsourcing (Lichtenstein 2004) in determining the outsourcing decision. When applying this model in a study of IT organisations, the cost of uncertainty was the highest deterrent contributing to the decision not to outsource. Access to technical skills was the biggest beneficial factor in the decision to outsource (Aubert et al. 2004).

Agency theory explores the outsourcing decision from the perspective of the potential principal-agent conflict between the outsourcing client and vendor. Agency theory examines outsourcing from the point of view of an uncertain venture owned by the principal (client) and performed by an agent (vendor) whose actions cannot be fully observed. When these conflicts are low, the project outcome can be easily measured and the vendor behaviour can be easily observed, the probability of outsourcing is higher (Tiwana and Bush 2007).

Obviously the benefits and challenges of OSD make a significant contribution into the decision to outsource. This is especially true in terms of the transaction cost theory. In that light, the next section examines the benefits and challenges of OSD in detail. The order in which the benefits and challenges are discussed closely follows their prominence in the literature.

LITERATURE REVIEW: BENEFITS AND CHALLENGES FROM OSD

A number of benefits exist to encourage a company to outsource software development. These include cost reduction, increased quality, access to skills, faster development time and closer proximity to markets (Haq et al. 2011). However, it also has been recognised there can be a paradoxical relationship with some of the benefits acting as challenges (Conchúir et al. 2009; Haq et al. 2011; Ramingwong and Ramingwong 2009). For example, low cost can be a benefit when using labour in low-cost regions, but the hidden costs of remote management associated with this can be a challenge.

With this in mind, this section discusses both the opportunity a benefit can offer and also the risks presented by a challenge. Some additional challenges (e.g., cultural differences between client and vendors, impact on employees, legal issues) will also be discussed. Even within these challenges there may be small benefits seen in certain circumstances.

Cost

Benefits: Cost reduction is a key factor used to select vendors for outsourcing software development, especially offshore (Khan et al. 2011). Numerous studies have found lower costs for software development is paramount to the outsourcing decision (e.g., Beaumont and Costa 2002; Conchúir et al. 2009; Lacity and Hirschheim 1994; Ramarapu et al. 1997; Ramingwong and Ramingwong 2009; Sobol and Apte 1995). A company's strategy is also a factor in outsourcing and organisations with a cost-focused software strategy, as opposed to a differentiation or niche strategy, are most likely to outsource (Berg and Stylianou 2009). Offshore outsourcing countries such as India and China have labour costs a tenth of those from countries such as the US, so the cost savings cannot be ignored (Oshri et al. 2011).

Challenges: Although the lure of cost savings from outsourcing to low cost regions is real, there are hidden costs to OSD offshore. Hard costs include travel, communication and vendor search and management. Soft costs arise when cultural differences and misunderstood requirements affect the software quality delivered, thus requiring rework. Also in-house employee morale suffers due to redundancies or fear of job loss leading to lower productivity or retention issues inhibiting the software development process. These hidden costs can often be overlooked when calculating the true savings of outsourcing (Ramarapu et al. 1997; Ramingwong and Ramingwong 2009; Weidenbaum 2005). There is also a concern that rising salaries of IT personnel in countries such as India, which has been reported at 15-20% a year, will impact the initial saving being sought

(Weidenbaum 2005). This rise will mean as labour rates increase, other countries with lower labour rates will be sought for outsourcing, potentially introducing switching costs (Whitten and Leidner 2006).

Development Speed

Benefits: The speed of software development can be increased in some OSD situations (Conchúir et al. 2009; Erran et al. 2010; Ramingwong and Ramingwong 2009). When OSD takes place offshore, usually the vendor and customer in the software development relationship will reside in different time zones. Multiple time zones can create an advantage for companies who have both in-house and offshore outsource development teams. For example, a development team in the US can transfer work at the end of their working day to an Indian-based team. This can create an almost continuous work day for a project, sometimes referred to as the follow-the-sun (FTS) concept. This provides the benefit of faster development speed and quicker time-to-market (Erran et al. 2010; Kobitzsch et al. 2001; McLaughlin and Deuel 2003; Sobol and Apte 1995).

Challenges: This advantage of FTS can become an issue when synchronous communication between teams is required at a time when one team is outside the working day. This can result in reduced collaboration time with another day being lost before an answer is available, which is undesirable in terms of speed of resolution for cross-team issues (Conchúir et al. 2009; Kobitzsch et al. 2001; Ramingwong and Ramingwong 2009; Sobol and Apte 1995).

In order for the FTS practice to work well the concepts of calendar efficiency, development method, product architecture and handoff efficiency are key considerations (Erran et al. 2010). Within these concepts, in-site coordination, cross-site coordination and personal productivity are variables that need to be monitored.

Skills

Benefits: A benefit of OSD for a company with limited technical capability or wanting to work in a new technical field is access to a large pool of skilled labour (Beaumont and Costa 2002; Conchúir et al. 2009; Manyika et al. 2008; Ramarapu et al. 1997; Ramingwong and Ramingwong 2009; Sobol and Apte 1995). Understandably, smaller firms put more emphasis on access to technology and an outsourcer's internal capability than larger firms (Berg and Stylianou 2009). Similarly, start-up companies are more open to outsourcing to avoid initial up-front capital costs (Lacity and Hirschheim 1994).

Challenges: Issues arise when the technology associated with the software development is complex, requiring developers to have a certain level of skill and build experience on the product being developed (Ramingwong and Ramingwong 2009). Unless team members are contracted for long periods, outsourcing work of this nature once does not guarantee the same people will work on a similar job next time. Therefore it may be considered unfeasible to outsource this kind of work (McLaughlin and Deuel 2003).

Quality

Benefits: Increased quality of software developed by outsource providers can be an unexpected benefit because outsourcing can drive a greater discipline of creating thorough and detailed specifications. This is especially true for countries like India and China where cultural differences mean clarity of specification and more accountability is essential for the success of the project (McLaughlin and Deuel 2003; Ramarapu et al. 1997).

Challenges: The low cost of OSD can sometimes give the impression of low quality (Ramingwong and Ramingwong 2009). This impression means outsourcers have been selective about what software development gets outsourced; a company should outsource those development tasks that are not considered core competencies or are non-critical to the company (Lacity and Hirschheim 1994; Reifer 2004). Stringent contract provisions and extensive quality assurance testing may be required to ensure a suitable product is produced.

Market Proximity

Benefits: Many companies in developed nations are focusing on the large and emerging consumer markets of countries such as India and China. For companies that intend to market product and services into these markets, having offshore software development located in these countries locates development teams closer to the market and customer (Conchúir et al. 2009; Ramarapu et al. 1997; Sobol and Apte 1995; Weidenbaum 2005).

Challenges: The difficulty with the market proximity strategy is that the benefits of market proximity can only be realised if the market mechanisms in the country are both relevant to and become embedded in the software. Too often employing technical skills in an outsourcing company do not necessarily translate to building customer relationships in that country.

Employees

Reduction in a client's workforce due to outsourcing can be a benefit or a challenge depending on which side of the hiring decision the employee is located (Ramingwong and Ramingwong 2009).

Benefits: Employees in countries on the vendor side benefit from increased employment, increases in the talent pool and growing prosperity within their country. Employees of companies that outsource benefit too, as they can up-skill to new roles such as in project management, providing enhanced career opportunities (McLaughlin and Deuel 2003).

At an organisational level, if a company stays competitive by outsourcing, although there will be some job losses in the short term, in the long term this may save the collapse of the company. This means that the prospect of many more job losses has been avoided, and if the company grows it may actually increase the skills required and hence compensation within the company for those employees who remain (Weidenbaum 2005).

Challenges: Employees in companies moving software development offshore are impacted by job losses and unemployment, creating challenges in nations that outsource heavily. The jobs most likely to be displaced were software programmers and developers for both development and maintenance as these jobs require less interpersonal relationships. Jobs requiring higher levels of face-to-face interaction such as IT analysts, or project management, are least likely to be outsourced offshore (Fish and Seydel 2006; Tambe and Hitt 2010).

Culture

Benefits: Cultural diversity in offshore OSD offers benefits in localisation and internationalisation of software both in terms of linguistics and business logic, such as local tax rules (Abufardeh and Magel 2010). Culture may also impact software user interface (UI) design. A more consistent UI experience across countries is more likely when the development team's culture is also diverse.

Challenges: Offshore OSD can bring significant challenges in the cultural differences, especially when developed Western companies such as the US outsource to developing countries such as India and China (Kobitzsch et al. 2001; Ramarapu et al. 1997; Sobol and Apte 1995). Face-to-face meetings are difficult due to the different locations of client and vendor, making it harder to create an understanding of cultural differences (Haq et al. 2011). Practical problems occur when religious and public holidays don't match. For example, the vast array of Indian religions and festivals produces numerous holidays. Indian outsourcing companies employ staff from various cultural backgrounds to ensure coverage during these holidays (Deshpande et al. 2010).

Legal

When outsourcing software development, significant consideration must be given to contractual obligations, service level agreements and what happens when things don't go right (Kobitzsch et al. 2001; Ramarapu et al. 1997). This is especially important when outsourcing offshore, which brings international law into play (Cinelli and Huffman 2006). Perhaps the key issue in a legal context is protection of intellectual property.

Benefits: A consideration in a knowledge-based industry, such as software development, is the management of intellectual property (IP) and innovation generation (Sobol and Apte 1995). Innovation can be a benefit of outsourcing software development by bringing new ideas into the development process (Deshpande et al. 2010).

Challenges: Three challenges for managing IP in OSD have been identified. First, the aspects of assessing, exploiting and defending IP need to be considered in the context of overall organisational performance when deciding to outsource. Second, contracts that allow knowledge sharing to facilitate the outsourced work can be contradictory in actually making the firm vulnerable in defending its IP. Third, outsourcing offshore introduces more complication in regards to legal regimes and cross-border laws for IP protection (Roy and Sivakumar 2011).

A BENEFITS / CHALLENGES FRAMEWORK FOR OUTSOURCING SOFTWARE DEVELOPMENT

The literature review has highlighted that there is a paradoxical relationship between the benefits and challenges, with a benefit acting as a challenge and vice versa under differing conditions. A high-level summary of the benefits and challenges associated with OSD from the literature reviewed has been presented.

A benefits / challenges framework is presented in Figure 1. The framework is relatively simple and straightforward, somewhat masking the complexity of the decision to outsource software development. Some of that complexity is explored in the findings of this research, presented after the discussion of the research design.

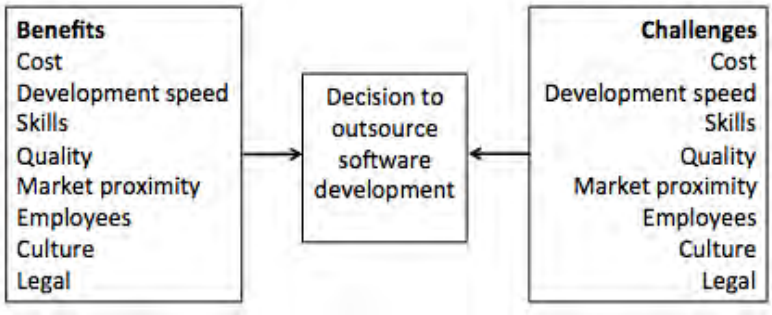

Figure 1: A Benefits/Challenges Framework for Outsourcing Software Development

RESEARCH DESIGN

A case study is appropriate to investigate "a contemporary phenomenon within its real-life context" (Yin 2009, p. 13) and so a multiple case study approach is used here. Data collection was via a semi-structured interview to allow the interviewer to cover a clear list of issues in an orderly fashion, with flexibility to probe into areas that arise in the course of the interview (Daymon and Holloway 2010). In this study, a semi-structured interview allowed both quantitative and qualitative data to be captured from participants during the course of the interview. A thematic analysis was used to look across the interviews and identify themes that correspond to the purpose of the study.

The key selection criterion for a company to be included in the research was that the company was to be based in New Zealand with software development outsourced to a third party, either for in-house software systems or commercialised products/service. Potential candidates for this research were software development companies, identified from Internet searches, trade magazines, professional industry networks and New Zealand ICT associations. Contact was made by email or phone and ten companies agreed to participate in the research.

After a pilot test of the survey instrument, face-to-face interviews were conducted with company directors, chief information officers (CIO), project managers, commercial managers, or development managers. An interview worksheet listed benefits and challenges identified in the literature and participants rated to what degree each were anticipated and realised on a five-point scale. This approach provided comparable quantitative data and consistency of data collection across the interviews. Then the bulk of the interview was devoted to discussion of the participant's ratings and additional open-ended questions.

All companies and participants were guaranteed anonymity in reporting of the results. One of the researchers was a participant in the OSD market at the time of this study, but no clients, suppliers, competitors or professional partners were interviewed for this research. Institutional ethical standards were considered, this research was judged to be of low risk and it was conducted on that basis.

RESULTS: DEMOGRAPHIC PROFILE

Generally there was a reasonable spread of companies by size: three small (<20 employees), two medium-sized (20-100 employees) and five large (>100 employees) companies. Comparative data are not available, but this probably reflects the profile of the companies engaged in software development in New Zealand.

The number of years' experience with OSD also was relatively even spread across the sample: three companies were new to OSD (1-3 years), three companies were very experienced (10 years or more) and the remaining four in between (4-7 years).

Nine of the ten companies outsourced software development onshore (New Zealand). Seven companies engaged in offshore OSD, mostly in India (6 of the 7) but offshore OSD also occurred in China, Pakistan, Philippines, Russia, and Vietnam.

Four companies outsourced only application development, one company outsourced only the maintenance of its in-house software systems and the remaining five companies were engaged in outsourcing both application development and maintenance.

RESULTS: BENEFITS AND CHALLENGES OF OUTSOURCING SOFTWARE DEVELOPMENT

This section presents the quantitative and qualitative results of this research in the benefits / challenges framework and includes observations from the international research presented earlier.

Table 1 presents a summary of the quantitative data. All ten participants were asked to rate how important each benefit was anticipated on a five-point scale (e.g., 5 = critically important) and to what degree each benefit was

realised (5 = fully realised). All ten participants were asked to rate the anticipated occurrence of each challenge (5 = high probability) and to what degree the challenge actually occurred (5 = fully occurred).

The principal data in Table 1 are the average ratings of the ten scores for each item. The numbers in parentheses are the rank of the item. For example, the average anticipated benefit from cost reduction is 3.3 (somewhat anticipated) and is ranked second among all anticipated benefits. The table is sorted by realised benefit.

Table 1. Anticipated and Realised Benefits and Challenges from OSD

	- - - - - -Benefits- - - - -		- - - - - -Challenges- - - - -	
Aspect	Anticipated	Realised	Anticipated	Occurred
Skills	4.3 (1)	3.9 (1)	2.5 (6)	2.6 (6)
Costs	3.3 (2)	2.7 (2)	3.2 (2)	3.1 (3)
Culture	2.7 (4)	2.6 (3)	3.6 (1)	3.7 (2)
Development speed	2.2 (6)	2.6 (3)	3.2 (2)	3.0 (4)
Quality	2.7 (4)	2.2 (5)	2.9 (4)	3.8 (1)
Legal	2.0 (7)	2.2 (5)	2.4 (7)	1.4 (8)
Market proximity	3.0 (3)	2.0 (7)	2.7 (5)	3.0 (4)
Employees	1.8 (8)	1.9 (8)	2.3 (8)	2.1 (7)

Skills

Benefits: Access to skills not available in-house was both the most anticipated and realised benefit for New Zealand companies conducting outsourced software development, with scores of 4.3 and 3.9 respectively. Participant 1 (P1) gave an example why this is so: "Access to skills [Apple iPhone development] not available in-house was critical, that's why we did it".

Challenges: In contrast to the skills benefits derived from OSD (highly anticipated, highly realised), the skill challenges were not anticipated (2.5, rank 6 out of 8), nor did these occur (2.6, rank 6). Of some concern of the companies who offshored OSD was determining the validity of the skills vendor's workforce: "The skill set might be there, the CV might be there, but can they actually do the same job?" (P2). Attrition rates and lack of communication around this also caused issues: "the churn was more than we thought... we were also surprised to find that someone else is there or someone has disappeared" (P6).

Two offshore OSD participants attempted to initially mitigate this issue, P10 taking an approach using outcome-focused contracts and P8 through relationship building summarised as: "I kind of went in with the approach that I wanted to find good people and build relationships with them".

Costs

Benefits: As identified in the literature (e.g., Beaumont and Costa 2002; Conchúir et al. 2009; Haq et al. 2011; McLaughlin and Deuel 2003; Ramarapu et al. 1997; Ramingwong and Ramingwong 2009; Sobol and Apte 1995) cost reduction is considered one of the primary benefits of OSD, especially in offshore OSD.

In New Zealand cost reduction is ranked second in both anticipated (3.3) and realised (2.7) benefits. Detailed analysis in McIvor (2013) showed anticipated benefits for onshore OSD (in NZ) equalled realised benefits. The difference was in offshore OSD in which realised costs benefits did not match expectations. Why? P6 offers one reason: "certainly the people who lived in India or who came over were being paid less, but by the time you put on a few layers of management and some margin and stuff you were at most talking a 20-30% reduction per hour but that would be more than matched by their 20-30% less efficient output, so I would say I have never seen it realised in terms of cost".

Challenges: Cost challenges were also of grave concern, ranking high in both anticipated challenges (2nd equal) and occurrence (3rd). Participants 2, 5 and 6 misjudged this as a challenge and reported it to fully occur (5 on the 5-point scale). P5 reflected "I think it would always be considered that we underestimated the project management required for outsourcing". In contrast, participants 3, 8 and 10 found the occurrence to be lower than anticipated, due in part to mitigation strategies such as "we always understood that aspect in terms of managing the relationship, in fact we actually changed our internal organisational structure to then work with an outsourcer…[to manage] the costs in communication and in travel" (P10).

Culture

Benefits: The OSD literature indicates that cultural influences can bring diversity and innovation into software solutions. Localisation of software components such as graphical user interfaces is seen as a benefit of culture (Abufardeh and Magel 2010), which overlaps the market proximity benefit to some extent.

In this study cultural benefits for OSD ranked near the mid-point of the list: 4th equal and 3rd equal. P7 cited the benefit of having an external person view development from a different perspective. P10 recorded high (4 out of 5) benefit expectations only to find that the cultural challenges impeded the realisation (2): "To be honest a lot of it is actually cultural in that a lot of the Indian guys… are waiting for direction, they're not so much on the front foot saying 'hey let's do this".

Challenges: In contrast to benefits, the challenges ranked at the top of the overall challenge list: #1 for anticipated challenges and #2 for most likely to occur. This is consistent with some of the literature (e.g., Kobitzsch et al. 2001; Ramarapu et al. 1997; Sobol and Apte 1995). The commonly associated issues within this challenge tend to be communication issues and misunderstanding of requirements. As P2 reflected "while we did think it was a potential issue, it was something we thought could manage and we could live with, but I think the more you got into it, the no pushing back and just saying "yes" to everything and then going off and not doing it certainly presented formal challenges". For the offshore OSD participants in this study, even though culture was a seemingly obvious challenge, and in most cases planned for, this was not enough to prevent its significant negative impact.

Development Speed

Benefits: A suggested benefit from literature on OSD was an increase in development speed mainly due to having the opportunity to leverage time-zone advantages between in-house and outsourced development teams (offshore) often termed the follow-the-sun (FTS) concept (Erran et al. 2010; Kobitzsch et al. 2001; McLaughlin and Deuel 2003; Sobol and Apte 1995).

Overall development speed ranked 3rd equal (2.6 out of 5) for realised benefits, which was much higher than was anticipated (ranked 6th, 2.2). Mostly this is attributed to NZ outsourcing vendors performing at or above expectations.

In contrast to the literature, leveraging FTS advantages appear to be more theoretical than practical: "We have never used that 24-hour working day thing… No one is really that organised" (P6). P9 reported what actually occurred: "they would jump on the phone each day and attempt to hand over the work they were doing, it just didn't work, it was near impossible, it turned into a two-hour exercise with everyone on headsets".

Challenges: Although rankings differ, raw results for the anticipated (3.2) and occurrence (3.0) of development speed challenges are similar. Most companies anticipated that development speed would be a challenge and it happened, aptly expressed by P6: "It wasn't a surprising challenge". Similarly, P1 noted: "It has mainly become more of a challenge because we live in such a rapid development environment".

Quality

Benefits: An increase in quality of the delivery when using OSD was suggested as a benefit largely due to the need to have clear specifications for sending work out of the company, which may not happen if software is developed internally (McLaughlin and Deuel 2003; Ramarapu et al. 1997).

Overall the realisation of the quality benefit ranked mid-range in anticipated (4th equal) and realised (5th equal) benefits. P7 had an interesting view that the premium cost being paid for onshore OSD was "because we would wield a big stick, it gave us an ability to say 'it's not working, we're paying you premium prices, so get it done right".

Challenges: The number one challenge facing outsourced software development in this study is quality of the finished product. The challenge of maintaining the quality of software was identified in the literature being linked to the required skill set being unavailable and misunderstanding of requirements (Ramingwong and Ramingwong 2009) and this is evident in this study. P6's experience reflects this: "We were a bit apprehensive about quality for most of these things, so I wouldn't say that was unexpected" and "So quality yeah, it was even worse than we thought".

Legal – Intellectual Property (IP)

Benefits: This benefit looked specifically at the creation of IP by outsourcing vendors. Comments from the participants suggest there is reasonable overlap with the cultural benefit discussed previously; in hindsight, these two benefits could have been combined.

Experiences and views differed. P7 found "what he [the outsourcing vendor] was saying, it became a huge benefit." P6 contrasted this saying "Occasionally we would have the vendor over and they would do a PowerPoint presentation and would talk about all their IP creation and skill, but it was never realised."

Challenges: Legal issues in intellectual property were also ranked low, numerically the lowest in this study. This challenge did not occur for seven of the ten participants and this may suggest that the challenge of protecting IP is not an issue. However P5 pointed out "We don't know that we have had any problems". The reality is that it is difficult to know if IP has been taken. Therefore the true occurrence of this may never be known or discovered some time later.

Market Proximity

Benefits/Challenges: Most of the literature suggests this as a benefit (e.g., Conchúir et al. 2009; Ramarapu et al. 1997; Sobol and Apte 1995; Weidenbaum 2005), but in the New Zealand context most of the participants were not operating in the market where the overseas OSD vendor was located, or product management in New Zealand mitigated any significant benefit. In the end, only three participants indicated it was applicable to their business models. This means the results provide only a limited degree of insight into benefits and challenges and so this is not discussed further.

Employees

Benefits: Ranked last in both anticipated and realised benefits is up-skilling in-house employees to manage the OSD process, introducing skills such as project management into the workforce. Generally smaller companies realised slightly better benefits than larger firms, undoubtedly associated with the assignment of the OSD activity. P4's comment reflects this: "Not really, it is really rare here as we use project managers for that rather than repurposing developers".

Challenges: The review of existing OSD literature highlighted the challenge of employee morale when work is outsourced. These morale issues stem from either redundancies that are made as work is outsourced or fear that this will happen. It is surprising that in this study the anticipation and occurrence of this challenge were ranked last and second last respectively. In explanation of this low ranking, P4 and P7 stated that the development being outsourced could not be done internally either, consequently no employees felt threatened by the activity.

Scalability as an Unexpected OSD Benefit

In the open-ended discussion part of the interview, participants were asked about any benefit or challenge missing from the lists compiled from the literature. In several interviews the benefit of scalability came up. Although it has some overlap with the skills benefit, scalability is also somewhat different, defined here as access to additional labour through outsourcing enabling a company to rapidly scale up production. A distinction was made by P9: "We assumed we already had all of those [skills]", but also "our key reason [for OSD] was scale, that was it, we wanted to be able to spin up teams fast to be able to flex out when we had to flex out".

In a follow-up telephone call, all ten participants were asked about scalability and both the anticipated (4.1 out of 5) and realised benefits (3.3) were quite high, second following skills. P8 saw this being especially important to small companies like his: it "was more of a fact of being able to scale up and down quickly… Being a bit more lean and agile in our approach".

This benefit had not been explicitly identified in the initial literature review. It would appear to be relevant in the New Zealand context of the study where the demand for software development resources exceeds the supply. This may not be such an issue in more populated nations such as the United States where the majority of the current OSD literature originates.

On the other hand, scalability is a factor that affects individual software development companies, independent of market size. American companies outsource despite widespread availability of domestic skills, implying that costs are a more important driver than skill availability. Therefore, the velocity of scalability is a novel contribution of this study to the literature.

CONCLUDING DISCUSSION

Limitations of the Research

The principal limitation in this study is the limited sample size. The total population of NZ companies who outsource software development is small, difficult to identify and several companies were unable to make time to contribute. Ten companies is still a reasonable number and full cooperation and participation were achieved from all participants. Within this sample, the qualitative data collected from the participants during the interviews is limited to their opinion of the outsourcing experience.

Suggestions for Future Research

Companies using OSD would benefit from additional research in the following areas:

1. Development speed was found to be good for onshore OSD, but poor for those participating in offshore OSD. An area related to this that often came up in discussion was the development methodology, principally waterfall versus agile and the effect on speed of OSD. This would be a useful aspect to research further.
2. In terms of the cost of OSD, research into a method to track the real cost of OSD taking into account overheads as well as labour costs. This would provide clarity to companies on the real benefit that OSD can offer with respect to reducing costs of software development.
3. Culture was a significant challenge, which while anticipated and attempts were made to mitigate leading into the OSD activity, it still occurred. Research into mitigation of this challenge would be beneficial especially as it flows on to impact the quality and development speed of the software development process.

Conclusion

This study has investigated the benefits / challenges framework of outsourced software development in a New Zealand context. The key findings of this study identify the most commonly realised benefits and occurring challenges for OSD. The findings generally support those found in the international literature, but have been specifically quantified in this study, and scalability was identified as an unexpected benefit. The study offers new insight for academics and practitioners interested in outsourcing software development.

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